DOCUMENT RESUME

ED 117 571 CE 006 298

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TITLE General mathematics: Part 2. Mathematics Curriculum Guide (Career Oriented).
INSTITUTION Louisiana State Dept. of Education, Baton Rouge.
REPORT NO Bull-1281; VT-102-867
PUB DATE May 74
NOTE 91p.; For related documents, see CE 006 282-297

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage
DESCRIPTORS Algebra; Arithmetic; Behavioral Objectives; *Career Education; *Continuous Progress Plan; *Curriculum Guides; Geometry; Learning Activities; *Mathematics; Mathematics Curriculum; Practical Mathematics; Relevance (Education); *Secondary Education
IDENTIFIERS Louisiana

ABSTRACT

The curriculum guide for secondary level, career-oriented General Mathematics Part 2, correlates performance objectives in basic mathematics with career-oriented concepts and activities. The material is designed to lead the student in a systematic development that provides for continuous progress. The guide is in outline format, providing a curriculum outline, performance objectives, and related career-oriented concepts, objectives, and learning activities. The guide encompasses the topic headings of refresher arithmetic and algebra; informal geometry; mathematics related to shop, construction, sewing, homemaking, sports, and travel; and mathematics for electricians. (MB)

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MATHEMATICS CURRICULUM GUIDE
CAREER ORIENTED
GENERAL MATHEMATICS II

BULLETIN NO. 1291

Louisiana State Department of Education
Louis J. Michot, Superintendent
1976

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RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
B. A mathematician applies the concept of prime numbers and composite numbers to the explanation of the Fundamental Theorem of Arithmetic.	B. The fundamental theorem of arithmetic states that every composite number can be expressed as a product of primes. Express each of the following numbers as a product of primes: 24, 18, 32.
C. A ship captain uses fractional numbers to compute the number of nautical miles a ship will travel at a given rate of speed in a given time.	C. A ship steams at 14 1/2 knots. At that rate how many nautical miles does it go in 6 1/4 hours? (1 knot = 1 nautical m. p. h.)

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
1. Common fractions	1. Add, subtract, multiply, and divide common fractions.
2. Decimal fractions	2. Add, subtract, multiply, and divide decimal fractions.
3. Comparing fractional numbers	3. Compare two given fractional numbers.
4. Scientific notation	4. Express a given number in scientific notation.
D. Ratio, Proportion, and Percent	D. To demonstrate an understanding of ratio, proportion and percent, the student should be able to:
1. Definitions	1. Define ratio, proportion, means terms, extreme terms
a. Lowest terms	a. Express a ratio in lowest terms.
b. Problem solving	b. Compute the missing term in a proportion when three terms are given.
2. Percent	2. Define percent
a. Conversion	a. Convert a common fraction to a decimal fraction and to a percent; a decimal fraction to a common fraction and to a percent; a percent to a common fraction and to a decimal.

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
D. A professional typist uses proportion to determine the time necessary to type a manuscript. A real estate agent uses percent to compute the commission on the sale of a house, and the amount of money the seller will receive.	D. Donna, a professional typist, can type 9 pages of manuscript in 12 minutes. She agreed to type an article of 21 pages. How long will it take her to type the article? A real estate agent sold a house for $15,500 and was paid a commission of 5%. What was the amount of his commission? How much did the seller of the house receive?

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
b. Problem solving	b. Use proportions to solve problems of the type: (1) What is 60% of 50? (2) What percent of 50 is 60? (3) 50 is 60% of what number?
6. Mixed review - Metric and English	6. To demonstrate an understanding of measurement, the student should be able to:
7. Definitions a. Approximate number b. Precision c. Greatest possible error d. Accuracy (number of significant digits) e. Relative error f. Percent error	a. Define: a. Approximate number b. Precision c. Greatest possible error d. Accuracy (number of significant digits) e. Relative error f. Percent error
b. Calculations	b. Compute the precision, greatest possible error, the relative error, and percent error of a measurement.
9. Least precise measurement	c. Determine which of several given measurements is least precise.
8. Precision versus accuracy	d. Determine which of two measurements is more precise and which is more accurate.

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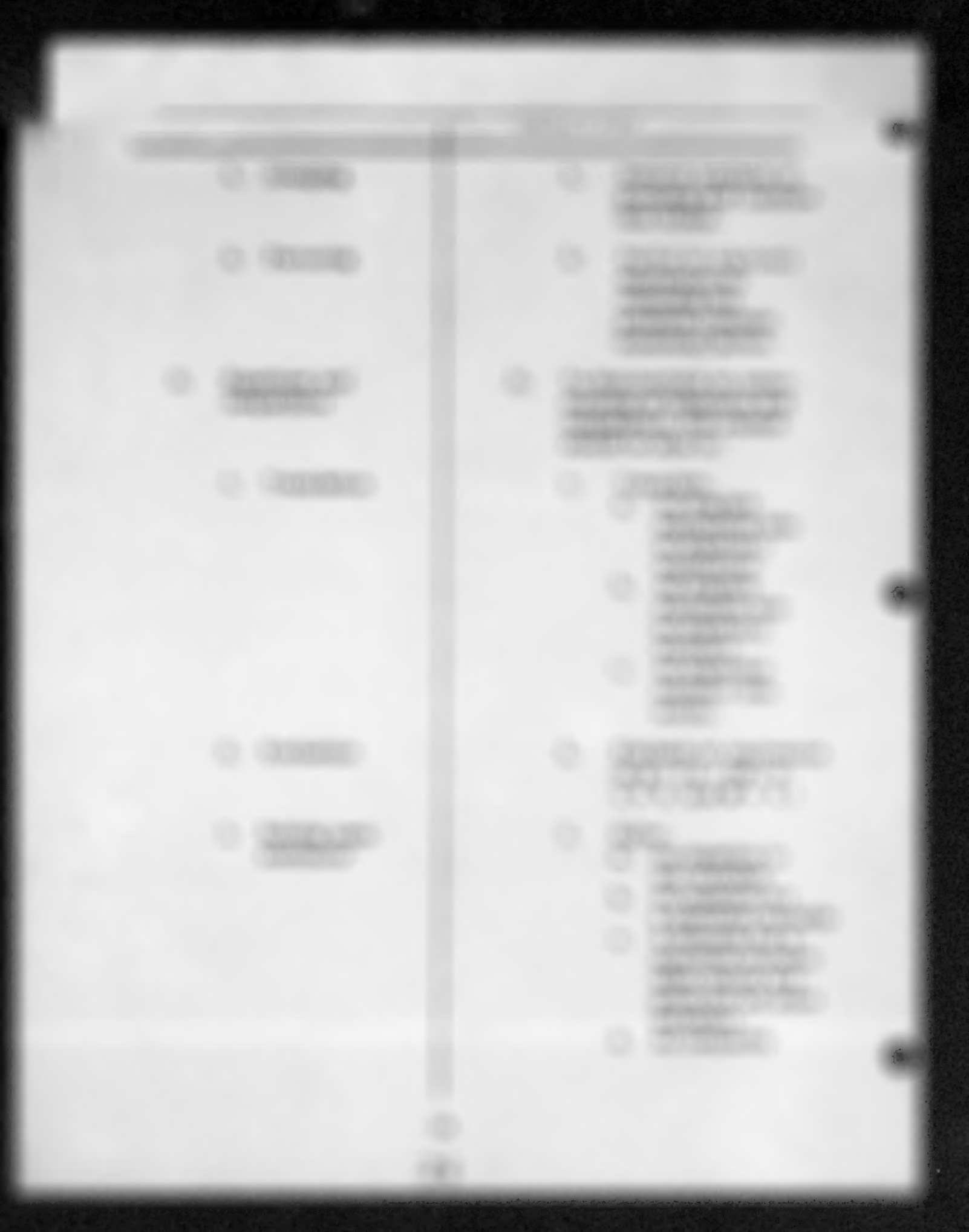

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
III. Career Concept Every career requires some special preparation. Performance Objectives	
A. The ground crew for a football field uses parallel and perpendicular lines in laying out the field for a game.	A. Construct a diagram of a football field given the scale of the drawing and the dimensions of the field.
B. A navigator of an airplane uses angles in constructing a scale drawing to show the position of a plane given the necessary data.	B. Make a scale drawing showing the position of an airplane at the end of 3 hours when flying on a course of 60°, with a ground speed of 250 m. p. h.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
	then ∠A is a right angle, ∠B is an acute angle, ∠C is an obtuse angle, and ∠D is a straight angle.
C. Constructions	C. To demonstrate a basic understanding of fundamental construction by using a compass and straight edge, the student should be able to:
1. Angle	1. Copy a given angle.
2. Congruent triangles	2. Construct congruent triangles.
3. Regular polygons	3. Construct a regular polygon of 3 sides, 4 sides, 6 sides.
4. Bisecting a line segment	4. Bisect a line segment.
5. Bisecting an angle	5. Bisect an angle.
6. Perpendicular lines	6. Construct a perpendicular to a given line: a. At a point not on the line. b. From a point not on the line.
7. Parallel lines	7. Construct a line parallel to a given line.
D. Defintions and relationships	D. To demonstrate an understanding of angle relationships, the student should be able to:
1. Angle sum of a polygon	1. Determine the sum of the measures of the angles of: a. A triangle b. A quadrilateral c. A pentagon

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
C. A craftsman uses basic constructions in laying out geometric shapes.	C. A piece of round stock is 3" in diameter. Construct the largest square that can be machined at one end.
D. A machinist uses angle relationship in his work.	D. What angle does side B of a regular hexagonal bar make with the surface plate as shown in the diagram?

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5. Special angle pairs	5. Define and sketch: a. Complementary angles b. Supplementary angles c. Vertical angles d. Corresponding angles associated with parallel lines e. Alternate interior angles f. Alternate exterior angles
6. Plane figures	6. To demonstrate a basic understanding of plane figures, the student should be able to:
a. Definitions	a. Define, sketch, and identify: a. Right triangle b. Equilateral triangle c. Isosceles triangle d. Scalene triangle e. Quadrilateral f. Parallelogram g. Rectangle h. Square i. Trapezoid j. Rhombus k. Circle l. Pentagon
b. Perimeter and circumference	b. Determine the perimeter or circumference of each figure listed above when the dimensions are given.

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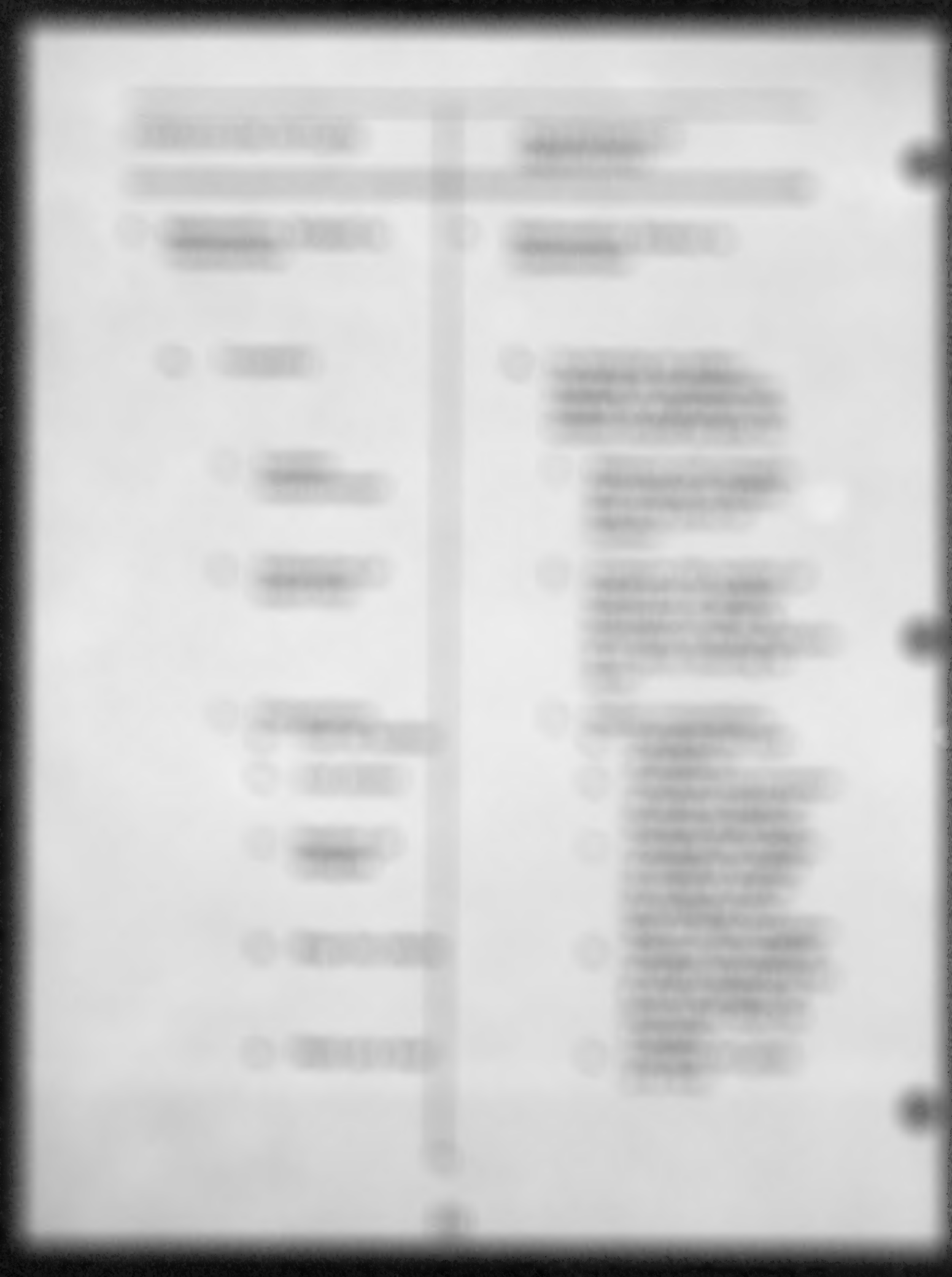

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
V. Career Concept Careers are interrelated.	
Performance Objectives	
A. A carpenter computes the number of board fe feet in a given amount of lumber.	A. Using the formula for board feet, compute the number of board feet in the following pieces of lumber: 120 pieces of 2" × 4" × 8'. What is the price of this lumber if it sells for $126 per M?
A contractor computes the total cost of building a house given the specified information.	A carpenter intends to build three small houses in a low cost subdivision through a subcontract. Using the table, determine the total cost of materials and labor for building each of the three houses.

Subcontract Costs	Two Bedroom Ranch (1000 sq. ft.)	Two Bedroom Provincial (1050 sq. ft.)	Three Bedroom Colonial (1350 sq. ft.)
Lumber and Trim	$3620	$3756	$4100
Carpentry Labor	$1050	$1150	$1600
Insulation	$ 300	$ 315	$ 395
Cabinets	$ 327	$ 375	$ 450
Hardwood Flooring	$ 200	$ 265	$ 370
Total Cost			

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
f. Cost of paint	f. Estimate the amount and the cost of paint necessary to paint a house, interior and exterior.
g. Number of nails	g. Estimate the number of nails needed for a specified job.
h. Length of rafters	h. Compute the length of rafters for a building.
i. Number of studs	i. Compute the number of outside studs needed for a wall given the spacing and dimensions of the wall.
4. Estimation of cost of a building	4. Estimate the cost of building materials needed to build a house to given specifications.
B. Masonry estimations	B. To develop a basic understanding of mathematics related to masonry, each student should be able to:
1. Quantities of cement, sand, and gravel	1. Estimate the quantities of cement, sand, and gravel needed for a concrete wall, given the specifications of the wall and the ratio of the mixture.

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
B. A brick mason computes the amount and price of concrete that will be needed to construct a driveway. A cement finisher determines the cost of cement for a concrete slab for a new house.	B. How many cubic yards of concrete are required for a sidewalk 4 ft. wide, 24 ft. long, and 4 inches thick? How much will it cost at $24.10 per cubic yard? Given the diagram below, compute the amount and price of ready mix cement for the slab which is to be 10" thick. If the price is $24.10 per cubic yard?

[illegible] OUTLINE	PERFORMANCE OBJECTIVES
b. Cost of connect	b. Determine the cost of connect for a sidewalk.
b. Number of Service	b. Determine the number of Service needed for a building.
c. Cost of Service for a building	c. Determine the cost of Servicing a building.

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RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
C. A private duty nurse makes conversions from scales on one syringe to scales on different syringes.	C. A doctor's orders states that the nurse must give U30 of a U40 solution of insulin to a diabetic patient. She does not have a U40 syringe, but she does have a U80 syringe. How does she determine the desired amount using a U80 syringe. Solution: U30:U40 = X:U80 40x = 2400 x = 60 units of U40 solution to be given in a U80 syringe.
D. A practical nurse converts a Celsius temperature to a Fahrenheit temperature.	D. Convert $40^{\circ}C$ to Fahrenheit.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
2. Fahrenheit to Celsius	2. Convert a Fahrenheit to a Celsius measure by using the following formula: C = 5/9 (F - 32).
E. Measurement	E. To develop a basic understanding of measurement, the student should be able to:
1. Apothecaries' system a. Symbols (1) Weight (2) Volume (liquid) b. Abbreviations and symbols	1. Use the apothecaries' system by: a. Identifying the symbols used for weight and volume. (Z, ℥, M, C) b. Identifying the abbreviation used for weight and volume.
2. Metric system	2. Identify the symbols for weights and volumes used in the metric system.
3. Household system	3. Identify the abbreviations for weights and volumes used in the household system.
4. Conversion	4. Convert given weights and volumes (liquid) from the apothecaries' system to the other two systems and vice versa.

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
E. A nurse converts a doctor's orders concerning a dose of medicine from apothecaries' measure to household measure.	E. Converts [illegible] to measurements.

EXAMINATION OUTLINE	PERFORMANCE OBJECTIVES
C. Using formulae	C. To develop a basic competency in calculating dosages, the student should be able to:
1. Calculating children's doses a. Young's Rule	1. Calculate children's doses by using: a. Young's Rule child's dose = $\frac{\text{age of child}}{\text{age of child + 12}}$ × average adult dosage.
b. Friedl's Law	b. Friedl's Law (dosage for infants under one year of age; ⅓ only for used for older children, infant's dosage = $\frac{\text{age in months}}{150}$ × adult dosage.
c. Clark's Rule	c. Clark's Rule (Narcotics and some antibiotics and other medications are administered to a child according to his weight.) child's dose = $\frac{\text{child's weight in pounds}}{150}$ × adult dosage
2. Problems in solutions	2. Solve solution problems by: a. Calculating the amount of pure drug needed to make a certain solution. (1) Formula A $\frac{\text{amount of solution wanted}}{\text{strength desired}}$ × strength on hand = possible desired

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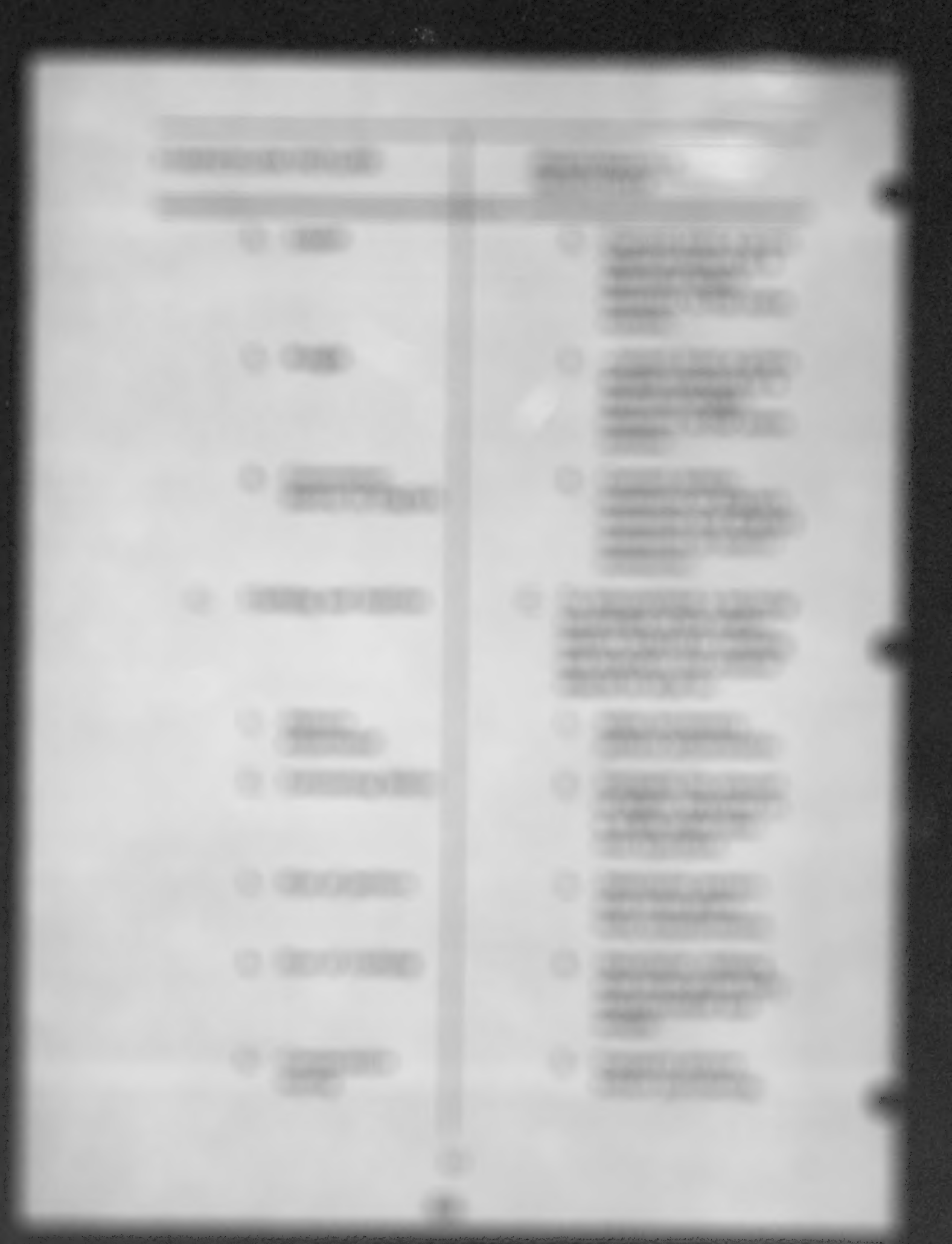

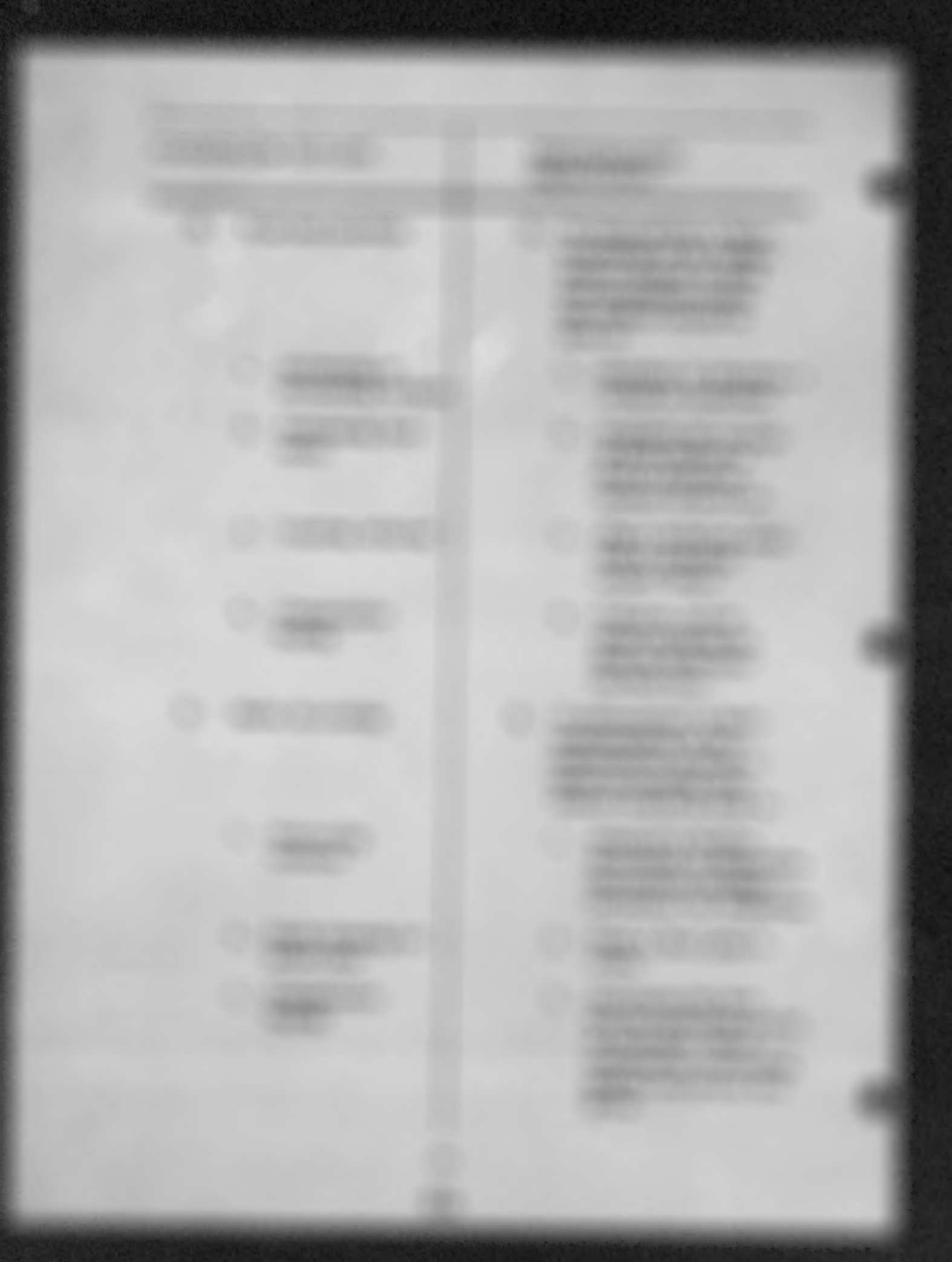

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
D. A caterer plans, prepares, and serves food for group entertainment. She uses mathematics to estimate the food requirement, and to purchase it at reasonable prices.	D. Plan a wedding reception for 200 guests. A budget of $500 for food is allowed. Decide on a menu, determine the food costs and the overhead, allowing a reasonable profit.
E. An interior decorator plans and furnishes interiors of homes and institutional buildings. He selects and plans arrangement of furniture, draperies, floor coverings, and accessories.	E. Estimate what it would cost to redecorate your living room. Consult a catalog to determine approximate prices of furniture, draperies, lamps, other accessories, and wall paint or paper.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
F. Family budget	F. To demonstrate a basic understanding of family budgeting the student should be able to:
1. Planning	1. Plan a budget for a specified income providing funds for necessary expenditures and for savings.
2. Maintaining records	2. Set up and maintain records of expenditure and balances within budgeted amounts.
G. Consumer oriented publications	G. To demonstrate an understanding of comparative shopping, the student should be aware of the availability of several publications which present to the consumer the results of unbiased comparative tests of similar products manufactured by different companies.

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
F. A family budgets its disposable income to meet current living expenses and to save for the future.	F. Plan a budget for a family that has a disposable income of $[illegible] per month. If the income is budgeted as follows: Food [illegible]% Household Operation [illegible]% Clothing [illegible]% Shelter [illegible]% Transportation [illegible]% Personal Advancement [illegible]% Savings [illegible]%
G. A businessman plans carefully for the best buys.	G. Mrs. Smith has the following list of groceries to buy: 6 lbs chuck roast (Store A, [illegible] lb., Store B, [illegible] lb.) Shortening, 3 lbs (Store A, $[illegible] for 1 lb, Store B, $[illegible] for 3 lbs.) Sugar, [illegible] lbs. (Store A, $[illegible] Store B, $[illegible]) Apples, 3 lbs. (Store A, [illegible] lb, Store B, [illegible] lb.) If the items at each store are of equal quality, at which store will she get the best bargain if she plans to buy all four items at one store?

SYNOPTIC OUTLINE	PERFORMANCE OBJECTIVES
IX. Mathematics Related to Sports	IX. Mathematics Related to Sports
A. Baseball	A. To demonstrate a basic understanding of mathematics as related to baseball, the student should be able to:
1. Batting average and field average	1. Compute the batting and fielding averages of a baseball player.
2. Earned run average	2. Compute the ERA (earned run average) of a pitcher.
3. Won-loss percentage	3. Compute a team's won-loss percentage.
4. Games behind	4. Calculate the number of games a given team is behind the leader in a particular league.
5. Bases accumulated	5. Compute the total number of bases accumulated by a player.
6. Slugging percentage	6. Compute the slugging percentage of a batter.
7. Box score	7. Complete a box score of a baseball game.
8. Scale construction	8. Draw a baseball field to a scale.

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b. [illegible]	b. [illegible]
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2) [illegible]	2) [illegible]
3) [illegible]	3) [illegible]
c. [illegible]	c. [illegible]
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d. [illegible]	d. [illegible]
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2) [illegible]	2) [illegible]

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
B. A passenger who travels by air reads fare tables and flight schedules.	B. Plan a trip from New Orleans to Chicago and use a fare table and flight schedule to determine the following: 1. Time of arrival at the destination on a specified flight. 2. Number and identity of enroute stops. Time of arrival and time of departure each stop.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
4. Comparison of services	4. Compare the routes, time schedules, and fares of competitive lines to determine the most convenient and economical airline.
C. Traveling by car	C. To demonstrate a basic knowledge of travel by car, the student should be able to:
1. Car ownership	1. Determine the expenses involved in car ownership by:
a. Payments	a. Computing the monthly payments after making a down payment
b. Insurance	b. Computing from insurance charts the following types of coverage on a car: property damage, bodily injury, collision, and comprehensive insurance
c. Operating costs	c. Computing the operating costs to include gasoline, oil, repairs, etc.
d. Depreciation	d. Compute the annual depreciation, and the average annual depreciation for a specified number of years.

RELATED CAREER ORIENTED CONCEPTS AND OBJECTIVES	RELATED CAREER ORIENTED LEARNING ACTIVITIES
C. An automobile owner computes the operating cost of his automobile for a designated period of time.	C. Mrs. Jennifer Leigh is interested in the expenses of the automobile of her own make. Based on the following data, how much is the operating cost? 300 gallons of gasoline, $.12 per gallon (average); oil filter (every second oil change), $5.00 each; 2 grease differentials lube, $.50 per pair; 1 pair transmission fluid, $1.00 per quart; 1 new rear suspension (replaced), $21.00 per pair; 1 complete steering unit, $65.00 each; 12 changes of engine oil (one each) $.10 per quart; 4 grease jobs, $6.00 each; maintenance expense charges, $375.00 total; estimated tire wear $250.00 total (depreciation not considered). Note: 3 quarts with filter change; 4 quarts without filter change.

[illegible]	PERFORMANCE OBJECTIVES
5. Grading a road way	5. Read a road way to determine: a. Which sightways to invest to get from city a to city b. b. The distance between two given towns, using the scale on the legend
5. Determine average speed	5. Determine the average speed mathematical on a trip given the dis- tance and time.
6. Traveling costs	6. Compute the cost of a trip when a cost- cent cent or send to pay for the trip.
5. Grading a car	5. Compare the cost of making a car for a specified length of time.
3. Traveling by bus	3. To demonstrate a basic understanding of traveling by bus, the student should be able to:
1. Reading a schedule	1. Interpret a bus schedule.
2. Computing fare	2. Determine fare for a specified trip.
3. Comparison of cost	3. Compare the cost with/for the advantages of travel by public car with those of travel by personal automobile.

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